

Claims

1. An ion generator, comprising:
 - a first electrode;
 - 5 two second electrodes;
 - a voltage generator, electrically coupled to the first electrode and the second electrode in order, when energized, to create a flow of air in a downstream direction from the first electrode to the second electrode;
 - 10 each of said two second electrodes having a leading portion and a trailing portion located downstream of said leading portion, and each of said two second electrodes having a length between the leading portion and the trailing portion; and
 - 15 an interstitial electrode, located between the two second electrodes, with the interstitial electrode located adjacent to the trailing portions of the two second electrodes, and said interstitial electrode having a length in the downstream direction that is substantially less than the length in the downstream direction of the two second electrodes.
 2. The generator of claim 1 wherein said second electrodes are fin shaped and said interstitial electrode is wire shaped.
 - 20 3. The generator of claim 1 wherein said second electrodes are fin shaped and said interstitial electrode is rod shaped.
 4. The generator of claim 1 wherein said interstitial electrode is located midway between the two second electrodes.
 - 25 5. The generator of claim 1 wherein said interstitial electrode is one of wire-shaped and

rod-shaped with the interstitial electrode located substantially along a line between the two trailing portions of the two second electrodes.

6. The generator of claim 1 wherein said interstitial electrode and said first electrode is
5 electrically connected.
7. The generator of claim 1 wherein said interstitial electrode and said second electrodes have the same polarity when said voltage generator is energized.
- 10 8. The generator of claim 1 wherein said first electrode has a first sign potential and can charge particles with the same sign potential, and said second electrodes and said interstitial electrode both have an opposite sign potential such that said interstitial electrode can deflect charged particles toward said second electrodes.
- 15 9. The generator of claim 1 wherein said first electrode emits ions when said voltage generator is energized, and wherein said interstitial electrode can neutralize the ions emitted by said first electrode.
10. The generator of claim 1 wherein said first electrode emits positive ions when said
20 voltage generator is energized, and wherein said interstitial electrode can neutralize the positive ions emitted by said first electrode by emitting negative ions.
11. The generator of claim 1 wherein said second electrode is removable by a user.
- 25 12. The generator of claim 1 wherein said second electrode is removable by a user for cleaning.

13. The generator of claim 1 wherein said generator is incorporated in a housing and with said housing comprises an electro-kinetic air transporter-conditioner.

5 14. The generator of claim 1 wherein said second electrodes are elongated and said interstitial electrode is elongated to about the same length as the second electrodes.

10 15. The generator of claim 1 wherein said generator is incorporated in an elongated freestanding housing and with said housing comprises an electro-kinetic air transporter-conditioner.

15 16. The generator of claim 1 wherein said generator is incorporated in a housing and with said housing comprises an electro-kinetic air transporter-conditioner; and said housing has a top and said second electrode is removable from said top for cleaning.

17. The generator of claim 1 wherein:
said generator is incorporated in an elongated freestanding housing with a top and said housing comprises an electro-kinetic air transporter-conditioner; and
wherein said second electrode is elongated and is removable from said top of said

20 housing.

18. The generator of claim 1 wherein:
said generator is incorporated in an elongated freestanding housing with a top and said housing comprises an electro-kinetic air transporter-conditioner; and
wherein said second electrode is elongated and is at least partially removable from
said top of said housing.

19. The generator of claim 1 wherein:

5 said generator is incorporated in an elongated freestanding housing with a top and said housing comprises an electro-kinetic air transporter-conditioner; and

5 wherein said second electrode is elongated and is telescopingly removable through said top of said housing.

20. The generator of claim 1, wherein said interstitial electrode is one of wire-shaped or rod-shaped.

10 21. The generator of claim 1 wherein said first electrode is an ion emitter and the second electrode is a collector of particulate matter.

15 22. The generator of claim 1 wherein said first electrode is positively charged and the second electrode is negatively charged.

23. The generator of claim 22 wherein said first electrode is pin-shaped.

24. A device for conditioning air, including:

20 a housing with an air inlet and an air outlet

a first electrode;

25 two second electrodes;

said first electrode located closer to said air inlet than said second electrodes;

said second electrodes located closer to said air outlet than said first electrode;

a potential generator electrically coupled to the first electrode and the second

25 electrodes in order, when energized, to create a flow of air in a downstream direction from the first electrode to the second electrodes;

each of said two second electrodes having a leading portion and a trailing portion located downstream of said leading portion, and each of said two second electrodes having a length between the leading portion and the trailing portion; and

an interstitial electrode located between the two second electrodes, with the interstitial electrode located adjacent to the trailing portions of the two second electrodes, and said interstitial electrode having length in the downstream direction that is substantially less than the length of the two second electrodes.

10 25. The device of claim 24 wherein said second electrodes are fin shaped and said
interstitial electrode is wire shaped.

26. The device of claim 24 wherein said second electrodes are fin shaped and said
interstitial electrode is rod shaped.

15 27. The device of claim 24 wherein said interstitial electrode is located midway between the
two second electrodes.

28. The device of claim 24 wherein said interstitial electrode is one of wire and rod shaped
with the interstitial electrode located substantially along a line between the two trailing
20 portions of the two second electrodes.

29. The device of claim 24 wherein said interstitial electrode and said second electrodes
are electrically connected.

25 30. The device of claim 24 wherein said interstitial electrode and said second electrodes
have the same polarity said voltage generator is energized.

31. The device of claim 24 wherein first electrode has a first sign potential and can charge particles with the same sign potential, and said second electrodes and said interstitial electrode both have an opposite sign potential such that said interstitial electrode can deflect charged particles toward said second electrodes.

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32. The device of claim 24 wherein said first electrode emits ions when said voltage generator is energized, and wherein said interstitial electrode can neutralize the ions emitted by said first electrode.

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33. The device of claim 24, wherein said interstitial electrode is wire-shaped or rod-shaped.

34. A device for conditioning air, comprising:

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a housing having an inlet and an outlet; and
an ion generator disposed within said housing, that creates an airflow in a downstream direction from said inlet to said outlet, including:

a first electrode;

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at least two second electrodes located downstream from said first electrode, each said second electrode having a nose and two trailing sides extending downstream, towards said outlet, from said nose;

an interstitial electrode, located between each said second electrode, and downstream of said nose;

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a high voltage generator electrically connected to said first electrode, said second electrode, and said interstitial electrodes.

35. An air conditioning device as recited in claim 34, wherein said interstitial electrode is located midway between said second electrodes.

5 36. An air conditioning device as recited in claim 34, wherein said first and second electrode have opposite polarities when said high voltage generator is energized.

10 37. An air conditioning device as recited in claim 36, wherein said first electrode emits ions to charge particles contained with the airflow.

15 38. An air conditioning device as recited in claim 36, wherein said interstitial electrode and said second electrode have the same polarity when said ion generator is energized.

39. An air conditioning device as recited in claim 38, wherein said interstitial electrode pushes or repels the oppositely charged particles towards said trailing sides of said second electrodes.

20 40. The generator of claim 1 wherein said interstitial electrode is at one of positive potential, negative potential, floating potential, and grounded.

41. The generator of claim 1 wherein said interstitial electrode has a potential sign which is opposite to the potential sign of the second electrode.

25 42. The generator of claim 1 wherein said interstitial electrode includes a plurality of interstitial electrode elements.

43. The generator of claim 1 wherein said interstitial electrode includes a plurality of

interstitial electrode elements which can establish a voltage gradient when energized.

44. The generator of claim 1 wherein said interstitial electrode is electrically connected to said first electrode.